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WEED ABSTRACTS

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NOTES FOR READERS OF WEED ABSTRACTS

Weed Abstracts endeavours to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end, over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organisations.

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As far as possible journal abbreviations given in the World List of Scientific Periodicals are used. Holding libraries in Oxford and elsewhere are also taken from the World List, e.g. O.BO. = Botany Department, Oxford. Numbers at the end of abstracts, e.g. 75(492) are for internal use only.

When a paper is by more than one author, only the address of the first author is given.

Where an abstracts is taken from an abstracting journal the acknowledgement follows the abstract, e.g. Herb.Abstr., 2,163. Where it is only quoted in part the acknowledgement is preceded by the word "from", e.g. From Biol.Abstr., 2,294.

The Information Section is always pleased to receive comments and suggestions for the improvement of Weed Abstracts.

* An asterisk before the author's name indicates that only the title of the paper has been seen.

Continued from the inside back cover.

ac	- acre(s)	in.	- inch(es)	p.s.i.	- pounds per square in.
a.e.	- acid equivalent	kg	- kilogram(s)		
a.i.	- acid ingredient	l	- litre(s)	v/v	- volume/volume
cm	- centimetre(s)	lb	- pound(s)	w/v	- weight/volume
d.b.h.	- diameter at breast height	m	- metre(s)	w/w	- weight/weight
		ml	- millilitre(s)	>	- greater than
ft	- foot (feet)	oz	- ounce(s)	<	- less than
g	- gram(s)	post-em.	- post-emergence	#	- pounds per acre
gal	- gallon(s)	pre-em.	- pre-emergence	±	- with or without
ha	- hectare(s)	p.p.m.	- parts per million		

Language abbreviations: an initial capital denotes the language of the article, a small letter that of the summary: - Dan. - Danish, Du. - Dutch, E. - English, F. - French, G. - German, It. - Italian, Jap. - Japanese, Nor. - Norwegian, Russ. - Russian, Span. - Spanish, Sw. - Swedish.

See also 1581, 1610, 1646, 1653.

1546. * FAIVRE-DUPAIGRE, R. Le desherbage du mais. [Weed control in maize.] Agric. (Paris), 1959, 22, (211), 107-12.

1547. * FUNDERBURK, H.H. Factors affecting the response of Zea mays to sodium 2,2-dichloropropionate. Ala Acad.Sci. J., 1958, 30, (2), 7-8.

1548. RHODESIA AND NYASALAND, FEDERATION OF. Rep.Secy Fed.Min.Agric.Rhod.Nyasaland, 1958, 1959, pp.215.

p.97. 2,4-D (ester or amine) and MCPA all at 1 # + 2 cultivations all resulted in maize yields considerably higher than from 2 cultivations only and slightly greater than from plots clean cultivated throughout the season.

p.103. Preliminary observation indicates very good results in killing Acacia spp. with 2,4,5-T (butyl ester) in dieseline and with Shell Diesel Fuel applied to slashes in the stem bark. 2,4,5-T in water and AMS have proved ineffectual and results from ring barking are not promising. A. rehmanniana was more resistant to all treatments than A. karroo, A. nicolata, A. gerrardii or A. nigrescens.

p.102. Veld burning experiments. Autumn burning has proved detrimental to grass cover and has little effect on the bush. Complete protection and annual burning at the end of the dry season on red soil are also inadvisable. Burning just before the start of the rains at intervals greater than every other year appears to control bush and to have no lasting deleterious effect on the bush [?grass]. D.M.L.S. [O.RE.]

1549. HARRIS, V.C. (State Coll., Mississippi, U.S.A.) Weed control in corn. Inf.Sheet Miss.agric.Exp.Sta., 1959, 620, pp.2, figs.1, tabs.2.

In 2 years' trials diuron 0.66 # gave excellent weed control in Dixie hybrid maize. In the first year the yields were very slightly less than the control and in the second year considerably more. Simazine was also used in the second trial and while 3 and 6 # gave excellent weed control and no crop injury yields were not so high as with diuron. - L.K. [42(76.2)]

1550. SINGH, D.J.C. (Dep.Bot., Agric.Coll., Bapatla, India). The role of hormonal herbicides in crops and weeds. Andhra agric.J., 1959, 6, (3), 139-44.

Includes the following information: 2,4-D (sodium and amine) and MCPA (sodium) at 0.5-1.25 # caused no toxic effects in ragi (Eleusine coracana) but were ineffectual against Cyperus rotundus, Trachys muricata, Euphorbia hirta and Croton sparsiflorus. 2,4-D (ethyl ester) was toxic to ragi. Fernoxone (2,4-D sodium salt 80%) 15 # applied to paddy 1 month before planting gave better results than hand weeding. Brinjals [Solanum melongena] and chillies [Capsicum sp.] were found to be highly sensitive to 2,4-D, MCPA and MCPB. The following weeds were controlled by 2.5 lb Fernoxone in 100 gal water/ac: Gynandropsis pentaphylla, Eclipta alba, Cleome viscosa, Pedalium murex, Euphorbia rosea, E. thymifolia, Argemone mexicana, Ipomoea reptans, Mollugo oppositifolia, Amaranthus viridis, Gisekia pharnaceoides, Oldenlandia biflora, and Alternanthera echinata. - D.M.L.S. [24(54)]

1551. * ORISHCHENKO, Ya.P. [Chemical weed control in millet in the chernozem steppe zone of the south-east.] Diss.Saratov Selsk. Inst., 1959.

c.f. Weed Abstr., 9, 219.

1552. * CHATEAU, R. Le desherbage en riziculture. [Weed control in rice.] J.agric. trop.et Bot.appl., 1957, 4, (11), 490-526.

1553. * GOSTINCHAR, J., ROVIROSA, J. and ANDREU, F. La escarda con herbicidas selectivos en el cultivo del arroz. [Weeding rice with selective herbicides.] Spain.Inst.Nac.de Invest.Agron.Trab.(Ser.Fitopatol.), 1957/58, 310, pp.25.

1554. * MIRANDA, H.S. [Control of weeds in unirrigated rice fields.] Agronomico, 1958, 10, (9/10), 14-5, (Portuguese).

1555. ITO, F. [The use of herbicides at the present time.] Plant Prot., Japan, 1959, 13, (5), 211-4, (Jap.)

In wet paddy in Japan the main herbicides used are derivatives of phenoxyacetic acids.

In 1958 18% of the wet paddy was treated (540 000 ha). - Ref.Zh.Biol., 1960,50120.

1556. HARRIS, V.C. Weed control in grain sorghum. Inf.Sheet Miss.agric.Exp.Sta., 1959, 625,pp.2, tabs.3.
In pre-em. tests in the greenhouse 2,4-D and NPA caused crop injury. In field tests pre-em. simazine 2-8 #, diuron 0.33-0.75 # and dinoseb 6-10 # caused no crop injury and simazine 2 #, diuron 0.33 and 0.5 # and dinoseb 6 and 10 # gave very similar yields (all higher than the control); only simazine controlled morning glory [Ipomoea sp.]. Only 1 of 8 varieties of sorghum treated pre-em. with simazine 2 # gave a yield less than the control, but the increases in yield of the other varieties varied considerably although weed control was similar in all cases. In a greenhouse test sorghum 6-8 in. tall was uninjured by simazine > 3 #. - L.K. [43(76.2)]

1557. * HOLDEN, D.J. Response of flax to triiodobenzoic acid. (Abstract) Proc.S. Dak.Acad.Sci. 1958, 1959, 37,91.

1558. * SCOTT, W.O. Pre-emergence chemicals for soybeans in Illinois. Soybean Digest, 1959, 19,(5),16.

1559. WURGLER, W. Observations sur les reactions du tabac a l'application de quelques herbicides. [Observations on the reactions of tobacco to a number of herbicides. Landw.Jb.Schweiz, 1959, 8,597-604, figs.4.
The symptoms produced on tobacco plants at various stages of growth by the sodium salts of 2,4-D 0.1%, MCPA 0.066%, and MCPB 0.04 and 0.075% and by trietazine 0.5-4 kg/ha are described. Simazine was lethal. It was concluded that the phenoxyacetic and the currently available triazine herbicides were too injurious for use in tobacco. D.M.L.S. [MD.H.]

1560. SHRIVASTAVA, M.M.P. (Agric.Res.Inst., New Dehli,India). Weeds and their control in potato crops. Allahabad Fmr, 1959, 33, (5),358-61.
Includes the information that the most important weeds in potatoes are: Asphodelus tenuifolius, Chenopodium album, Cyperus rotundus, Cynodon dactylon, Argemone mexicana, Melilotus alba, Convolvulus arvensis and Anagallis arvensis. - L.K. [RT]

1561. HOROWITZ, M. (Inst.Plantes de Grandes Culture,Sta.Rech.Agron.,Nve-Yaar, Israel). [The influence of weeds on sugar beet.] Hassaden, 1960, 40,(5), (Hebrew), figs.1,tabs.2,bibl.1.
The effect of 0-5 handweedings + hoeings over periods of 0-240 days on root yield, % sugar, sugar yield, yield of aerial parts ("feuilles et collets") and number of plants is compared. Clean weeding throughout the season produced nearly 8 times more roots than the unweeded plot which had the lowest sugar % and the lowest number of plants/dunam. Root yields showed an almost linear correlation with the periods of weediness. Although the difference was not significant plots kept clean during early growth appeared to produce higher yields than those weeded later. In general, there was no significant or noticeable difference between weeding followed or not followed by hoeing. - D.M.L.S. [31(569)]

1562. BURTCH, L.M. and CARLSON, C.M. (Spreckels Sugar Co.,Woodland,Calif., U.S.A.) Yield comparisons from chemically and hand-weeded sugar beets under several water grass conditions in California. J.Amer.Soc.Sugar Beet Technol., 1959, 10,(6),467-77, tabs.5,bibl.3.
In several experiments, dalapon (sodium) 85% was applied at 3.5-9.5 # in mid-season when beet was 8-15 in. high and E. crusgalli at various stages up to 12 in. high. Under all situations which included various timings and frequencies of application and directed and overall sprays, control of E. crusgalli was insufficient and yields not satisfactorily increased. Uncontrolled E. crusgalli reduced yields from 2-ca. 14 tons/ac compared with hand-hoed plots which showed the best economic control and the highest yields. An experiment in which dalapon was applied to 6 sugar beet varieties indicated no difference in varietal response; yields of all 6 varieties were reduced. - Authors' Summary (modified). - D.M.L.S. [NIAE]

1563. UNITED STATES. Rep.Univ.Fla agric.Exp.Sta., 1959, pp.415.
p.55. Soybeans. In 3 experiments with pre-em. applications the most satisfactory treatment was PCP (sodium) 8 # which gave ca. 90% control of annual weeds without injury; rates up to 12 # also caused no injury. Chlorpropham 12 #

caused slight temporary injury; 9 # gave excellent control of annual weeds. EPTC 5 and 10 # was almost as effective. Trietazine and NPA 2 and 4 # were extremely toxic to crop. Two analogues of EPTC- R 1607 [n-propyl di-n-propylthiolcarbamate] and R 2061 [propylethyl-n-butylthiolcarbamate] were effective at 10 # but caused slight injury.

p.64 and 339. Peanuts. Pre-em. dinoseb 9 and 12 # gave excellent weed control without injury; chlorpropham 6 and 9 # and CDAA 12 # were nearly as good. 2,4-DES 2, 4 and 6 # gave fair to good weed control with little or no injury. Post-em. dinoseb 3 # ± 2,4-DES 2 when peanuts were 1 week old gave excellent control of annual weeds with only slight leaf burn of peanuts which did not affect yield.

p.83. Mechanism of action of 2,4-D. The conclusion reached in previous work that 2,4-D treatment of plant roots caused an increase in the amount of glucose metabolized through the pentose phosphate pathway was verified by comparing the metabolism of radioactive glucose with that of radioactive gluconic acid. Metabolic rates were postulated from the yields of radioactive carbon dioxide obtained when glucose or gluconate containing radioactive carbon atoms at different positions in the molecule were added to the root tissue. After 2,4-D treatment the root tissue metabolized glucose in essentially the same manner as gluconic acid. This would be expected to occur if glucose were metabolized through the pentose phosphate pathway.

It was found that whereas Antimycin A only slightly inhibited the respiration of 2,4-D treated tissues, it strongly inhibited that of untreated tissues. This indicated that the normal mechanism for hydrogen transport was being by-passed in the 2,4-D treated tissues and was perhaps causing a preferential oxidation of the coenzyme, triphosphopypyridine nucleotide. The activation of the pentose phosphate pathway would be expected to follow under these conditions. The observed results were consistent with this interpretation and suggest that one of the effects of 2,4-D was to modify the basic mechanisms involved in glucose metabolism.

p.247. Citrus. When applied to the root zone of young bearing citrus trees, the following gave good weed control without apparent injury:- diuron 20 #, dalapon 2.5 #, simazine 40 #, atrazine 20 #, trietazine 40 #, methoxy propazine 20 # and propazine 40 #. The following caused injury:- fenuron 20 #, monuron 20 #, 2,4-D 12.5 #, 2,4,5-T 12.5 #, monuron-trichloroacetate 22 #, erbon 9.6 #, 2,4,5-TP 25 #, fenac 25 #, sodium chlorate 200 #, TCA 25 #, sodium arsenite (48 # As_2O_3), amitrole 10 #, 2,3,6-TBA 5 #, hexachlorocyclopentadiene (3% in oil) 100 gal/ac, hexachloroacetone (3% in oil) 100 gal/ac, borax 200 #, and ammonium thiocyanate 100 #. The following caused no injury but gave little or no weed control:- chlorpropham 12 #, CDAA 80 #, MH 4 #, SMDC 80 #, DMTT 50 #, AMS 100 #, neburon 10 # and EPTC 40 #.

Citrus grove ditches. Typha spp. were controlled with dalapon 10 + 10 # with a fortnight's interval, fenuron 7.5 # + TCA 15 #, and by amitrole 10 #. Fenuron 20 # + dalapon in split applications of 11.1 # with a 10-day interval and 2,4,5-T (triethylamine) 4 # + the same dalapon treatment were very effective in controlling ditch weeds. The following were less effective in descending order: monuron 20 #, 2,4,5-TP 4 #, monuron-trichloroacetate 22 #, 2,4-D 4 #, diuron 20 #, and sodium arsenite (arsenic trioxide 48 #). Dalapon 5.55 + 5.55 # with a 10-day interval used alone and in combination with each of the above compounds gave more than 90% control of Panicum purpurascens and of Hyparrhenia rufa in all plots. No injury was found on bearing Marsh grapefruit or on Valencia oranges on sour orange stock growing 30 ft from the treated areas.

In trials where potted seedlings of rough lemon, sour orange, sweet orange and Cleopatra mandarin were irrigated with 2 in. of water containing dalapon, amitrole and fenuron-trichloroacetate at 15 and 30 p.p.m. and TCA at 150 and 300 p.p.m., rough lemon appeared the most tolerant to the TCA and amitrole, Cleopatra mandarin followed by sour orange to the dalapon, and sweet orange to the fenuron-trichloroacetate treatments. TCA and fenuron-trichloroacetate were the most toxic to the seedlings.

Citrus planting sites. Cynodon dactylon was nearly eradicated by dalapon 4 + 4 # (with a 10-day interval) and observation up to 6 months showed no ill-effects on rough lemon seedlings 24-36 in. planted at weekly intervals after the second treatment.

Citrus tree control. In trials on mature trees of below average size and vigour in which chemicals were applied to holes in the outer xylem near the trunk base no treatment killed the tops within 5 months; the best results were obtained with:- arsenic trioxide 36 g/tree, dalapon 30 g, potassium iodide 50 g, sodium chlorate 50 g, TCA (sodium) 28 g a.e. and 2,4,5-TP 24 g. Only arsenic trioxide, dalapon, 2,4,5-T (amine) and 2,4-D (amine) caused root damage and that occurred after 3 months. When applied as sprays, the most phytotoxic

of 12 chemicals were: 2,4,5-T (ester) 56 g/tree (as a trunk spray in oil), DMTT 1.7 lb/tree in 4 gal water (applied over the root zone, and 2,4,5-TP 56 g in oil as a trunk spray. All of these caused serious injury to the tops in ca. 2 months and to the roots within 5 months. Hexachlorocyclopentadiene or hexachloroacetone at 67 ml/tree as trunk sprays in oil killed the tops within 5 months but did not injure roots beyond 6 in. from the crown. When applied as water sprays to the soil (220 ft^2) under the trees and to the lower branches, none of the following caused root injury within 5 months; their phytotoxicity to the aerial parts is given in decreasing order:- 2,4,5-TP 56 g/tree, TCA (sodium) 1 lb, sodium chlorate 2 lb, ammonium thiocyanate 1 lb and erbon 56 g. Ground sprays of fenac (ester) 56 g a.e./tree or of arsenic trioxide 36 and 72 g/tree appeared to cause no injury within 5 months.

p.270. Vegetable crops. In a celery seed bed trial, methyl bromide and "Kil-drench No. 4" fumigants provided satisfactory weed control without adverse effect on seedlings. Post-em. Niagara 4562 (N-3,4-dichlorophenyl)-2-methylpentanamide) gave outstanding weed control without crop injury. Emergence and development of Florida Giant peppers were normal under all combinations of CDAA or CDEC with no fertilization, fertilizer banded over the drill, rainfall, or supplemental irrigation. In pre-em. trials in head lettuce, green- and red-ribbed endive, escarole, romaine and Chinese cabbage only romaine was affected by CDEC 2, 4 or 6 #, whereas all crops except Chinese cabbage were severely stunted by all rates of CDAA, red-ribbed being more susceptible than green-ribbed endive.

p.305. Tomatoes. EPTC 2 and 4 # pre-setting and 4 and 6 # at lay-by and Karmex diuron 1 # at lay-by significantly reduced annual weeds and grasses without significantly affecting weight or size of crop. Applied at time of staking, Solan [N-(3-chloro-4-methylphenyl)-2-methyl pentanamide], EPTC (raked in) and diuron gave satisfactory weed control on sandy soil without significantly affecting crop weight or size.

p.322. Applied on new land to unstaked tomatoes, the following all caused slight yield reductions: (1) EPTC 4 # at lay-by; (2) EPTC 4 # at bedding + 5 # before setting + 5 # at end of harvest; (3) EPTC 4 # at lay-by and at end of harvest; (4) Karmex DW [diuron] 1 # at lay-by + 2 # at end of harvest. Both compounds caused slight temporary injury, that from diuron being the more severe. A year later the same treatments were applied except that (2) was changed to 5 # pre-setting + 5 # at end of harvest. Little or no phytotoxic symptoms were observed; (2) produced the highest yield and the control the next highest.

p.393. Potatoes. Yield was not affected by dinoseb 2 and 4 # in 100 gal water, PCP (40% + emulsifier) 4 and 6 # or CDEC 2 and 4 #, applied pre-em. EPTC 6 and 12 #, incorporated, applied pre-planting gave 44 and 68% control of Cyperus rotundus without affecting potato yield.

Cabbage. CDEC 4 # pre-em. caused no injury to seedlings; 2, 3 and 4 # applied 3 days after transplanting caused slight leaf injury but plants recovered within a week and yield was not reduced.

p. 273. Sugarcane. In screening trials sugarcane was tolerant of simazine, atrazine, propazine, and methoxy propazine all of which gave adequate weed control for 3.5 months. Sugarcane was tolerant of EPTC up to 12 # incorporated in both organic and coastal sand soils.

p.283. Ditchbanks and fence rows. Best control but not eradication of napier grass [Pennisetum typhoideum] was obtained with Karmex FP [fenuron] pellets 120 # and by Urox [monuron-trichloroacetate] granules 170 #; all other weeds were eliminated except elderberry [Sambucus spp.] and castorbean [Ricinus communis]. In another trial Urox granules at 210 # eradicated napier grass. On muck and on marl-rock canal banks the following had obtained almost complete control of all vegetation, mainly Panicum purpurascens, after 6 months:- Karmex (diuron) 25 and 50 #, Karmex FP (fenuron) pellets 160 #, simazine 50 W 80 # and granules 400 #, Telvar (monuron 80%) 25 and 50 # and Urox (monuron-trichloroacetate) granules 360 #. Rates refer to commercial formulations.

p.284. Senecio glabellus. When applied up to the full-bud stage $\geq$ 85% control was obtained with 1.5 # of: MCPA, 2,4-D, 2,4,5-T, or 2,4-D + 2,4,5-T.

p.301. Aquatic weeds. The most effective herbicides tested for control of alligator weed [Alternanthera philoxeroides] included 2-chloro-4-fluoro-phenoxyacetic acid (n-butyl ester and dimethyl amine) and special weighted emulsions of 2,4-D, 2,4,5-T and 2,4,5-TP with specific gravities adjusted to ca. 1.003 with either aromatic or aliphatic oils as diluents. Other formulations, including invert emulsions of 2,4-D and 2,4,5-T, yielded good above-water control but not underwater. Granular 2,4-D and 2,4,5-TP at 20 and 40 # gave

only slight control of rooted emergent alligator weed; they were effective against Southern naiad in aquaria but not in ditches. Sodium arsenite liquid was effective on Southern naiad at 9 p.p.m. As_2O_3 (by weight) but the granular was ineffective at rates up to 80 # As_2O_3; acrolein applied to a ditch gave practical control at 2-6 p.p.m. by volume. Excellent control of submersed and floating weeds was obtained with acrolein applied with the irrigation water on a farm and in a citrus grove. In both cases fish and other aquatic animals were killed but no crop or tree damage caused. Water lettuce [Pistia stratiotes] was controlled by simazine 20-25 # and by invert emulsions of 2,4-D and 2,4,5-T at 10-15 #.

Polebeans. EPTC 4 and 6 #, incorporated, applied pre-planting and pre-em. gave excellent control of nutgrass [Cyperus sp.] at both periods. Yields were best from 4 # pre-em. or 6 # pre-planting. EPTC 6, 4 and 2 # incorporated, at time of staking, gave 98, 90 and 76% weed control respectively and all treatments increased yields compared with the untreated check; 4 # is recommended for sandy soils.

Sweet corn. EPTC, simazine and diuron applied at lay-by did not reduce the weight or length of ears; simazine 1 # at lay-by is recommended for sandy soil.

p.311. Gladiolus. Flower yields of varieties Spic and Span, Valeria, Hopman's Glory, Spotlight and Elizabeth the Queen were not affected by the following:- Eptam [EPTC] 6 # (incorporated) pre-em. and at lay-by; simazine 1 # pre-em. and at lay-by, and 1.6 # at lay-by only. There was no significant decrease in size or quality of new corms recovered from the plots.

p.344. Pasture weeds. Satisfactory control of Typha spp. was given by dalapon 5 # (2 or more applications), of Myrica sp. by 2,4-D (ester) 2-3 #, of Jussieae sp. by 2,4-D (ester) 0.5-1 # and of Caesar burr by 2,4-D (ester or amine) 0.5-1 #, all in 100 gal water. Saw palmetto [Serronoa serrulata] 36-60 in. high was controlled 60-70% by 2,4,5-T (ester or amine) 4 # and plants less than 48 in. high were similarly controlled by 2,4,5-T (ester) 3 and 4 #.

p.371. Vine control in avocado and lime groves. The main vines are Abrus precatorius, Momordica balsamina, Parthenocissus quinquefolia, Rhus radicans and Stizolobium decringianum. Amitrole 4 and 6 # applied as a basal spray (under the trees drip line) killed a mixture of the vines without noticeable injury to the avocado trees other than a few scorched leaves where the herbicide had contacted them. Diuron 6, 8 and 10 # also gave good control except of A. precatorius but caused some leaf margin necrosis on avocados and severe leaf and fruit drop of limes involving loss of the season's crop. - D.M.L.S. [O.W.]

1564. * NAKAMURA, O., NAKANO, M. and FURUKAWA, S. [Studies on the method of use of herbicide CL-IPC to direct-sown rape.] Kyushu agric.Res., 1959, 21,90-1, (Jap.)

1565. BREESE, T.C., JEATER, R.G., HOSSELET, E.O. and DELLE COSTE, A.C. (Fernhurst Exp. Sta.,Haslemere,Surrey,England). Efectos del acido 2,4-DB sobre alfalfa y algunas malezas de este cultivo. [2,4-DB effects on alfalfa and some alfalfa weeds.] Rev.Argentina Agron., 1959, 26,(1/2),42-8, figs.1,tabs.3.

The following dosages were tested in replicated trials in a few lucerne fields of Buenos Aires and Santa Fe provinces of Argentina: potassium salt of 2,4-DB at 800, 1200 and 1600 g of acid equivalent/ha, the butyric ester of 2,4-DB at 400, 800 and 1200 g of acid equivalent/ha and the control. The only treatment that was injurious to the lucerne was the 1200 g butyric ester dosage. Sylibum marianum was controlled by all doses of the butyric ester. The potassium salt was less effective. Carduus acanthoides and C. nutans var. macrocephalus were controlled by the largest potassium salt dosage and by all the ester dosages. Cirsium vulgare was controlled by all the ester dosages while Chenopodium sp. and Brassica spp. were controlled by all the treatments. Growth was reduced by Raphanus sativus, Echium plantagineum, Apium sp. and Onopordon acanthium but not enough for weed control purposes. - Biol.Abstr.(Plant Sciences), 35, 27856.

1566. KARAPETYAN, N.O. [Dodder - its harmfulness and control.] Isv.Min.Selsk.Arm. S.S.R.Selsk.N., 1958, (5/6),81-8, (Armenian, russ.)

Experiments carried out from 1952-4 under irrigated conditions in Armenia showed dodder [Cuscuta spp.] was particularly injurious to lucerne and grape vines. The most effective way of controlling it in lucerne is to cut low and treat the stubble with polychlorinated benzol (600 l/ha). In vines excavating to a depth of 25 cm and 2 weedings in May eradicated the weed. - Ref.Zh.Biol., 1960,50143.

1567. MANSSON, E. Om bekämpning av baldersbrå och bladdödning i fröklöver. [Control of scentless mayweed and killing of leaves of seed clover.] Svensk. Frötidn., 1959, 28, (5),80-2, (Sw.), figs.

1568. ORMROD, D.P. and WILLIAMS, W.A. (Univ. Calif.,Davis,Calif.,U.S.A.) Vegetative and reproductive growth response of three trifolium species to 2,4-D. Agron.J., 1960, 52, (4),229-34, figs.8,bibl.9.
A review of previous work is given.
A series of experiments under range and cultivated conditions, were carried out on (1) T. hirtum, (2) T. incarnatum and (3) T. subterraneum in which rates of 2,4-D, time of application in relation to growth stages, and volume of spray material were considered. (3) was found to be much more tolerant to 2,4-D applied during the active growth stage than (1) or (2), as measured by forage and seed production, % of normally germinating seedlings from seed of treated plants, and % stand the year after 2,4-D treatment. (2) was more tolerant of a low rate of 2,4-D than (1) when applied at the pre-bloom stage. If treatment was made during flowering many of the seed germinated into malformed seedlings. A large spray volume had a beneficial effect on the % normal germination of seed from plants treated with a low rate of 2,4-D. From Authors' Summary. - J.W.F. [O.RE.]

Noted

1569N. NETHERLANDS. De bestrijding van planteziekten en onkruiden in landbouwgewassen. [The control of pests and weeds in agricultural crops.] Rijkslandbouwvoorlichtingsdienst voor Zeeuwsch-Vlaanderen, 1960, pp.20.
Includes general recommendations for herbicides. - L.K. [197(492)]

1570N. ORSENIGO, J.R. (Everglades Sta., Belle Glade, Florida,U.S.A.) Experiences in crop production research in Latin America. Proc.Soil & Crop Sci.Soc.Fla, 1958, 18, 49-62.
Mainly with reference to herbicide experiments in rice and coffee in Venezuela and Costa Rica. - L.K.

HORTICULTURAL, ORNAMENTAL AND PLANTATION CROPS

See also 1563,1566,1630,1637, 1639,1651,1654.

1571. KAYS, W.R. and GALEOTTI, C. Studies of chemical weed control in spinach. Okla.agric.Exp.Sta.Processed Ser., 1959, P-330,pp.7, tabs.3.
CDEC 3 # and EPTC 2 # gave acceptable control of broadleaved and grass weeds (Lamium amplexicaule, Monolepis nuttalliana, Mollugo verticillata and Echinochloa sp.) and significantly increased the yield of spinach compared with the unweeded control. Higher rates of either compound, chlorpropham 3 #, CDEC 4 + chlorpropham 2 or 3 #, 3Y9 4 or 6 # or dinoseb 0.5 and 0.75 #, or of 2,4-D 0.5 and 0.75 # (even when spinach seed was dusted with activated carbon) were injurious. - L.K. [33(76.6)]

1572. KRISHNAMURTHI, S. and BHANDARI, P.B. Modification of leaves in the chilli (Capsicum frutescens L.) as a result of whole plant sprays of high concentrations of certain plant regulators ("plant hormones"). Indian J.Hort., 1957, 14,239-40, bibl.6.
Abnormalities induced by 2,4-D and β-naphthoxyacetic acid. - Hort.Abstr., 30,2306.

1573. KRYLOV, S.V. [Chemically treated paper mulch for seedbeds.] Dokl.Mosk.Selsk. Akad.Timiryazeva, 1957, 29,69-73.
The paper was produced from sulphite kraft impregnated with different concentrations of [unspecified] herbicides. After sowing weed seeds the ground was covered with this paper, and carrot, beetroot and radish seeds were sown into perforations of various sizes. The germination of the crop seeds was retarded when they were sown into holes 5-8 mm in diameter, but was not affected when the diameter of the holes exceeded 10 mm. Weed emergence was retarded for 60 days. - Hort.Abstr., 30,(2),20.

1574. UNITED STATES. Rep.Wash.Res.Progr. agric.Econ., 1959, 10,pp.4.
Dinitro [?dinoseb] amine applied to mint beds when mint was 2 in. high increased yields 50%, reduced rust infection by 92.5% and controlled annual weeds. - From Hort.Abstr., 30,(2),3080.

1575. * van KAMPEN, J. [Chemical control of onion and shallot weeds.] Zaadbelangen, 1959, 13,(7),105-7.

1576. SHADBOLT, C.A., BRENDLER, R.A., HALL, B.J., ASHTON, F.M., ALDRICH, T.M. and DUNSTER, K.W. (Univ.,Riverside,Calif.,U.S.A.) Use of herbicides in transplanted celery. Calif.Agric., 1960, 14,(4),6-7, figs.1, tabs.1.

In pre-planting tests simazine 0.5-4 #, chlorpropham 8 # + 20 gal Stoddard solvent or 16 # alone, CDEC 8 # + 20 gal Stoddard Solvent or 16 # alone, neburon 16 #, EPTC 16 # and propham 16 # did not give satisfactory results, nor in post-planting trials did chlorpropham 8 # + 20 gal Solvent, EPTC 5 or 15 #, CDEC 4 and 8 #, propham 1 and 2 #, monuron and diuron 0.5-2 # or simazine 0.5 #. The best results were given by post-planting treatment with neburon ca. 1 #, chlorpropham 6 # + 20 gal solvent and 1.5 #, Dicryl [N-(3,4-dichlorophenyl) methacrylamide] and Karsil [N-(3,4-dichlorophenyl)-2-methylpentanamide]. - L.K. [O.W.]

1577. * ÅVALL, H. Kemisk ogräsbekampning i köksväxtkulturer. [Chemical weed control in vegetables.] Jord,Gröda,Djur,Arsb., 15,128-32.

1578. SWITZERLAND. Landw.Jb.Schweiz, 1959, 8,(6),439-657.

p.539-41. Weed control in strawberries. Further trials confirmed that neburon 0.74 kg/ha is effective against Stellaria media (though not against most other weeds) without injuring strawberries. Rates of 0.925 and 1.85 kg/ha especially the latter reduced strawberry yields on a sandy soil. 2,4-DES 3 and 4 kg/ha did not injure strawberries but gave insufficient weed control.

Grass control. Dalapon 5% in June and August gave only seasonal control of Agropyron intermedium whereas dalapon 5% + 2,4,5-T (sodium) 0.2% in June gave complete control.

Ploughing in late autumn and early spring followed by simazine 10 kg/ha immediately after sowing maize gave 98.7% control of Agropyron repens at the end of September; simazine 2.6 kg/ha gave 88.8% control.

When applied in November, TCA 1% at 1000 l/ha was very effective against Alopecurus myosuroides and increased rape growth whereas application at the end of March was ineffectual against A. myosuroides.

Onions. Yields were increased by neburon (18.5%) 8, 5 + 5 and 10 + 10 kg/ha in April or April and June and by Cereax (potassium ethyl xanthate) 20 kg in May or in May and July. The greater the amount applied the higher the yield. - D.M.L.S. [MD.H.]

1579. NORTHERN IRELAND. Chemical weed control in horticulture. Leafl.Min.Agric. N.Ireland, 1960, 145,pp.25, tabs.5.

A comprehensive booklet giving recommendations for the use of herbicides in fruit crops, vegetables, shrubs, flowers and lawns. These include: gooseberries and blackcurrants - chlorpropham 1-2 # as directed spray in winter and simazine 1-1.5 # in early spring; raspberries - chlorpropham 1-2 # in November; broad beans - chlorpropham 2 # as a residual pre-em. spray; Spiraea, Deutzia and ornamental Prunus not to be treated with simazine; speedwell [Veronica spp.] in lawns - 2.5-4% water solution of tar oil at 1 gal/48 yd^2. - L.K. [18(416)]

1580. ALBAN, E.K. (Dep.Hort.,Ohio agric. Exp.Sta.,U.S.A.) Chemical weeding of vegetable crops - 1960. 45th Annu.Proc. Ohio Veg.& Potato Growers Assoc., 1960, 76-84, tabs.2.

Presents in tabular form the 1960 recommendations for use of herbicides in vegetable crops in Ohio. Simazine and atrazine 2 # are now recommended pre-em. on sweet corn. EPTC during 1959 gave good weed control in potatoes when applied 4 # pre-planting and as directed post-em. spray, and this material will be available for limited trial in 1960. CDEC is recommended as pre-em. treatment on 16 crops, and post-em. on others. It is stated that research results with this material have been variable during the past 4 years. Crop damage has been only a minor concern, but weed control varied from excellent to very poor. For good results, there should be adequate soil moisture after application and a temperature of less than 80°F. For control of Agropyron repens on non-crop land, the following are recommended: TCA (sodium) 30-40 #, dalapon 10-20 #, amitrole 5-7.5 #, MH 15-20 # all applied to vigorously growing grass in early spring or early fall. - H.A. Roberts. [NVRS]

1581. TREVETT, M.F. and MURPHY, H.J. (Agric. Exp.Sta.,Orono,Maine,U.S.A.) 1960 Chemical weed killers. Misc.Publ.Maine agric.Exp. Sta., 1960, 639,pp.33.

Recommendations include: (1) beans (snap, dry or lima) - dinoseb 3-4.5 # + CDEC at emergence and EPTC 1 day pre-sowing; (2) blueberries - dinoseb 4.5-6 # as directed spray; (3) autumn planted tulips and daffodils - dinoseb 3-6 # pre-em.; (4) spring planted gladiolus - dinoseb 6 # pre-em.; (5) cucumber - dinoseb 1.5 # pre-em. or NPA 3 # pre-em.; (6) lettuce - chlorpropham 0.5-1 # or CDEC pre-em.; (7) millet - 2,4-D (amine) 0.25-0.5 # when fully tillered; (8) potatoes - diuron (80%) 0.75 # pre-em., dalapon (85%) 3 # + dinoseb 1.5-3 # pre-em.; (9) spinach - chlorpropham 1-2 # or CDEC; (10) squash - dinoseb 1.5 # pre-em.; (11) nutgrass [Cyperus spp.] - in spring disk in new growth when 3-4 in. tall them incorporate EPTC in 25-50 gal water. - L.K. [W1(74.1)]

1582. UNITED STATES. Rep.Wash.Res.Progr. agric.Econ., 1959, 9,pp.8.

Pole beans. Of 14 treatments with EPTC and neburon at various rates, the most consistent weed control was obtained with neburon pre-em. at 2 #.

Strawberries. Simazine and neburon continue to be the most promising herbicides, simazine being effective against a wider range of weeds. 1 # of simazine appears to be the maximum; 2 # significantly reduced the yield of Marshall strawberries.

Cranberries. On a young non-bearing bog the best control of Equisetum sp., Juncus sp. and sedges [Carex spp.] was given by simazine (wettable powder) 4 #, simazine (wettable powder) 2 # and NPA (sodium) 5.28 # in that order. Other compounds tried were 444E and NPA (sodium) granular. In a trial on a bearing bog amitrole gave the best control of Equisetum sp., tideland clover [Trifolium sp.?], Juncus spp. and Carex spp., the other compounds tried being Geigy 444E, simazine, SMDC, neburon and NPA (sodium granular.

Ornamentals. Quackgrass control - simazine 5 # gave very good control of quackgrass [Agropyron repens] and at 10 # almost eliminated it for 8 months. Both rates caused slight chlorosis in Japanese yew and 10 # slightly reduced growth of Mediterranean heather.

Mixtures of simazine and dalapon and of simazine and amitrole were injurious to nursery stock.

Rooted cuttings. Simazine 1-8 # applied on May 1st 1 month after planting rooted cuttings caused no damage to Woodwards arborvitae, Cypres-syano-viridus, Japanese holly, English holly or English yew. Laurestinus, Potentilla, Springwood White heather and Wintercreeper euonymus were injured by 8 # but not by 4 #, and Caroline azalea, Japanese andromeda, Autumn Glory veronica, and Cypress veronica were injured by 8 and 4 # but not by 2 #. Simazine granular 4 # was promising. Neburon 3 and 6 # gave moderate and good weed control respectively but at 6 # caused some injury to Laurestinus, Cypress veronica, Caroline azalea, Wintercreeper euonymus and Japanese andromeda.

Established plants. Simazine 3 and 6 # applied in early May each year has given excellent weed control for 9 months through 2 years of growth without injuring Woodwards arborvitae, Rock cotoneaster, Mediterranean Hybrid heather or Cynthia rhododendron and causing only slight chlorosis to Japanese yew at both rates. Neburon 3 and 6 # gave moderate and good weed control respectively for 4 months both years and caused slight to moderate chlorosis to Japanese yew at both rates.

Perennial and annual flowers. In preliminary trials simazine and neburon applied on May 1st at low rates caused slight injury to Shasta daisy, pansy, chrysanthemum, ajuga and primrose in July but recovery was complete by September. DMTT, neburon, simazine granular, NPA granular and EPTC granular and emulsifiable gave good summer weed control with no injury to marigold, petunia or zinnia.

Rose cuttings. Simazine 3 and 6 # applied November 1st to hardwood cuttings was very promising for winter weed control; no injury occurred and rose growth was greatly increased. - D.M.L.S. [MD.H.]

1583. BIVINS, J.L. (Agric.Ext.Serv., Coll.Agric.,Davis,Calif.,U.S.A.) Weed control in sweet pea seed crop at Lompoc. Calif.Agric., 1960, 14,(5),11.

Neburon and CDEC have given promising results as pre-em. treatments. - L.K. [O.W.]

1584. KNIPP,O. and ZIMMER, K. Die Unkrautbekampfung in Erikenbeeten. I. Erfahrungen aus Frankfurt. II. Erfahrungen aus Hannover. [Weed control in erica beds. Trials at Frankfurt and Hanover.] Gartenwelt, 1959, 59,439-40.

Preliminary trials at Frankfurt demonstrated the feasibility of using weak solutions as follows, viz. 0.1 g/m^2 simazine, 0.05-0.1 g/m^2 diuron and 0.05-0.1 g/m^2 Telvar (monuron). It is realised, however, that their residual effects may be deleterious to other subsequent crops and further work is considered necessary. At Hanover equally promising results were

given by HS 55 [N-cyclo-octyl-N'-dimethylurea 16% and 1-butynol ester of m.chlorocarbanilate 11%]. - Hort.Abstr., 30,(2), 2054.

1585. * LEACH, D.G. Chemical weed control in Rhododendron plantings. Quart.Bull. Amer.Rhododendron Soc., 1959, 13,(2),89-90.

1586. * de S. SANTOS, A. Problems of the coffee plantation. IX. Weed control. Gaz. Agric.de Angola, 1959, 3,(12),537-42,560.

1587. * CHOW, N.P. Weed control with chemical herbicides on sugar cane fields in Taiwan. Taiwan Sugar, 1959, 6,(9),13-20.

1588. KULKARNI, K.R. (Arabhavi,India). A preliminary study on weed control in sugarcane crop and accelerating cane germination. Mysore agric.J., 1959, 34, (2),77-81, tabs.3,bibl.7.
Treating sugar cane with an organomercurial (Aretan) before planting overcame the adverse effects that pre-em. application of 2,4-D have on germination. - L.K. [C.A.]

1589. HILL, R.G. and ALBAN, E.K. Chemical solves vineyard problem. Ohio Fm & Home Res., 1960, 45,(3),36,47, figs.1.
A single seasonal application of diuron is recommended in established grapes at 3-6 # depending on soil type. - L.K. [O.W.]

1590. GUAGLIA, A. Il diserbo chimico dei frutteti. [Chemical weed control in orchards.] Inf.fitopat., 1959, 9,282-3.
Includes the following recommendations:- in cherry orchards - chlorpropham 15 l/ha; in vineyards - amitrole 5-10 kg/ha, monuron (in old vines only) up to 4 kg/ha before weed germination, dalapon 2.25 g/m^2, chlorpropham 14 l/ha, and 2,4-DES 4-6 kg/ha; in citrus - amitrole 3-6 kg/ha in 600-800 l water, monuron (in adult plants only) up to 4 kg/ha in spring; for general use in orchards and vineyards in autumn and late winter-early spring, diuron 1-3 kg/ha, simazine 1.5-5 or these 2 compounds mixed together or with amitrole. - D.M.L.S. [M.D.H.]

1591. * BULLOCK, R.M. Weed control in strawberries. Ann.Rep.Ore.State hort. Soc., 1958, 50,91-93.

1592. * HOED, J. and BOUGARD. [Selective weed control tests in hop fields.] Belg. Hop, 1959, 10,(34),23,25-7, (Flemish).

1593. * HANEY, G.P. Effects of hardwood control and seedbed regeneration on the regeneration of loblolly pine (Pinus taeda L.) For.Thesis, N.Carolina State Coll., 1956.

1594. * KIANG, T. Chemical control of weeds in forest plantations. Tech.Bull. Taipei Nat.Taiwan Univ.for.Exp.Sta., 1957, 14,1-3.

1595. * CROWTHER, C.R. Weed control methods related to establishment and growth of young planted conifers. For.Thesis,Iowa State Coll., 1956.

BIOLOGY OF WEEDS AND POISONING BY WEEDS

See also 1656,1710.

1596. SUSPLUGAS, J., LALAURIE, M., PRIVAT, G. and NOMDEDEU, M-P. Contribution a la biologie des plantes phanerogames parasites. I. Metabolisme glucidique d'Orobanche hederae Duby, et de son hote Hedera helix L. [The biology of parasitic phanerogames. I. The carbohydrate metabolism of Orobanche hederae Duby, and its host Hedera helix L.] Trav.Soc.pharm. Montpellier 1958, 1959, 18,(3),165-8, (F.)
Large amounts of starch were found in the underground reinforced stems of Orobanche, attached to the roots of Hedera which it was parasitising, and in the flowers. Starch appears to be an important reserve carbohydrate which is not completely used in the very short vegetative season of Orobanche. The starch grains ofHedera have a different size and shape. Thus, Orobanche is able to polymerise soluble carbohydrates into starch. - Ref.Zh.Biol., 1960, 44920.

1597. * LEAL, A.R. and ROIG, F.A. Los hospendantes de hemiparasitos y parasitos fanerogamicos en el alto Valle de Atuel (Mendoza). [The hosts of phanerogamic parasites and hemi-parasites in the high Valle de Atuel.] B.Soc.Argentina de Bot., 1958, 7,(2),116-9.

1598. ROTH, L.F. (State Coll.,Corvallis, Ore.,U.S.A.) Natural emplacement of dwarf mistletoe seed on ponderosa pine. For.Sci., 1959, 5,(4),365-9, figs.3,bibl.11.
The movement of all seeds intercepted by 15 branchlets of the middle and lower crown of a 12 ft ponderosa pine sapling recorded during 2 seasons showed that when discharged, the seeds of Arceuthobium campylopodum f. campylopodum adhere mainly to the needles (rather than the stems) and generally remain on them until the first wetting rain. The viscin layer of the seeds readily absorbs water when moistened and the seeds swell and slide along the needles aided by a viscin fraction which lubricates the surface. They finally lodge most often against the stems in the axil of the fascicle or against the open end of the fascicle sheath. On the tree studied ca. 20% of the seeds had been transferred to the twigs by the end of the year, 25% remained on the needles, and 55% were washed off or otherwise removed. - Partly from Author's Summary. - D.M.L.S.
[O.F.]

1599. TAKAHASHI, N. and OKA, H.I. A preliminary report of dormancy in wild rice seed. Sci.Reps.Res.Inst.Tohoku Univ.Dep. Agric., 1959, 10,(2),81-5.
A wide range of variation in seed dormancy exists in wild rice [Zizania sp.] plant populations. Most wild rice lines have much stronger seed dormancy than usual cultivated rice varieties but some of them seem to approach the extent of the cultivated varieties. The degree of dormancy was significantly correlated with heading date and with ligule length. From the results of moist storage of dormant seeds on filter paper in Petri dishes and incubation of them in soil, the moist condition, specially incubation in soil breaks down the dormancy of wild rice seeds. - From Biol.Abstr.,(Plant Sciences), 35,27552. - J.W.F.

1600. SRIPLENG, A. and SMITH, F.H. (Univ.Bangkok). Anatomy of the seed of Convolvulus arvensis. Amer.J.Bot., 1960, 47,(5),386-92, figs.15,bibl.20.
The anatomy of the embryo, endosperm and seed coat during development from fertilisation to maturity is described and illustrated. - K. Holly. [O.W.]

1601. OAKES, A.J. Germination of elephant grass (Pennisetum purpureum Schum.) J.Agric.Univ.P.R., 1959, 43,(2),140.
From Herb.Abstr., 30,462.

1602. MURPHY, A.H. and TURNER, D. A study of the germination of medusa-head seed. Bull.Dep.Agric.Calif., 1959, 48, (1),6-10, figs.,bibl.13.
Seed of Elymus caput-medusae, collected at maturity in early July, remained dormant for 90 days. Seed collected after range burning did not germinate if the seed coat had been scorched or the awn burnt off. The species is an aggressive annual with no value as forage. - Herb. Abstr., 30,633.

1603. SAVIN, V.H. [The characteristics of morphobiological groups of white pigweed (Chenopodium album L.).] Vestnik, Leningrad, 1957, (21),148-52.
In the Leningrad population of white pigweed, in accordance with certain morphobiological indications and the speed of plant development, 5 morphobiological groups were separated. The Vinnitsa population manifested fewer varieties, and all the cultivated plants essentially belonged to a group, similar to 1 of the groups of the Leningrad population. The cultivation of the plants during days of different lengths indicated that the white pigweed is related to the plants of the short day, while the plants of the separated morphobiological groups reacted differently to the change of the length of the day. The modification of the method of exposure to light reflected on the morphogenesis of the plants and on the length of the period of rest in the pollinated seeds. - Biol.Abstr.(Plant Sciences), 35,33087.

1604. * KNEEBONE, L.R. and MEREK, E.L. Brief outline of and control for mushroom pathogens, weed moulds, indicator moulds and competitors. 1-3. MGA Bull., 1959, 113,146-52; 114,190-4; 115,226-8.

1605. ROBSON, N.K.B. Studies in the genus Hypericum. Ph.D.Thesis, Edin.Univ., 1956, pp.170, figs.98,tabs.2,bibl.123.
The studies are mainly taxonomic. A list of chromosome numbers (with sources) gives the following for H. perforatum: n-16 (17,18); 2n-32,48; and for H. mutilum: n-8. The irregular somatic numbers in H. perforatum are attributable to its pseudogamus apomictic method of reproduction. Some information concerning the distribution of H. perforatum and H. mutilum is included. A suggestion that H. perforatum is a natural hybrid is

referred to and possible parents suggested. - D.H.L.S. [E.u.]

1606. KUWABARA, Y. [The development of weeds on cultivated land and the classificatory characteristics of their seeds and shoots.] J.Geobot., 1958, 7,(4),118-22, (Jap.)
Describes the seeds and shoots of Avena fatua L., Agropyron ciliare Franch.f. Okuyame Ohwi, Brachypodium sylvaticum P. Beauvois, Eragrostis multicaulis Steudel, Festuca parvigluma Steudel, Melica nutans L., Milium effusum L. and Paspalum thunbergii Kunth. - Ref.Zh.Biol., 1960, 39749.

1607. JAEGER, P. Contribution a l'etude du comportement des ecotypes du Knautia arvensis (L.) Coult. [A contribution to the study of the behaviour of ecotypes of Knautia arvensis (L.) Coult.] Bull.Soc. bot.Fr., 1960, 107,(1/2),12-14, (F.), figs.2,bibl.8. [O.BO.]

1608. STOJANOVIC, D. Prilog poznavanju vrsta i varijeteta Cuscuta na teritoriji severne Srbije. [A contribution to the knowledge of species and varieties of Cuscuta in northern Serbia.] Plant Protection, Belgrade, 1959, 54,21-7, figs.7,bibl.15.
The following taxa were found during 1953-56: (1) Cuscuta epithymym Murray vars. typica and cuspidata; (2) C. epilinum Weihe; (3) C. europaea L. vars. vicfiae and gemuina; (4) C. pentagona var. typica and (5) C. lupuliformis Krock. - J. Kovacevic.

1609. * RASINSH, A.P. [Data on the history of cultivated plants and weeds on the territory of Latvian S.S.R. up to the 13th Century. Akad.Nauk.Latviiskoi SSR Inst.Biol.Trudy, 1958, 8,125-44, (Russ.)

1610. MILOSEVIC, L. and JOVICEVIC, B. Korovska vegetacija strnih zitu Kosova i Metohije (Prethodno saopstenje). The weed vegetation of small grains in Kosovo and Metohia. Zborn.Naucnih Radova Inst. Poljo.Istraz.Akmo, 1959, 2,(2),321-44, (e.) [66(497.1)]

1611. LITVINENKO, A.H. [From experimental work on mapping weeds of Kolhozes.] Trud.Odessk.Selsk.Inst., 1958, 10,(2),69-71.
A study was made of the weediness of grassland and soil at different depths, and the weeds of a rotation in the Odessa region were mapped. The greatest number of viable weed seeds were found in the surface layers 0-10 cm under winter cereals and at 10-20 cm under ploughed ground. - From Ref.Zh.Biol., 1960, 44892. - L.K.

1612. BRZHEZITSKII, M.V. and AKHMEDBEILI, G.A. [The weed flora of vineyards of Apsherone.] Bull.Ser.Uch.Zap.Azerb.Univ. Biol.Ser., 1959, (3),3-7, (Russ.)
120 spp. of weeds were found, of these annuals were 65%, perennials 29% and biennials 6%. - Ref.Zh.Biol., 1960, 60531.

1613. * HOWELL, J.T. Distribution data on weedy thistles in western North America. Leafl.West.Bot., 1959, 9,(2),17-29.

1614. * YANG-HAN, L. and HAN-CHING, H. [A general survey of the weeds and ecological anatomy study of the typical plant indicators of the National Kwangpei Farm and its vicinity located on the saline soil, newly cultivated region. Acta Agric.sinica, 1959, 10,(2), 102-20, (Chinese), figs.,bibl.29.

1615. NANNFELDT, J.A. (Inst.System.Bot., Uppsala,Sweden). Två för Norden nya Euphorbia-parasiter. [Two parasites on Euphorbia, new for Nordic countries.] Bot.Notiser, 1960, 113,(2),210-1. bibl.3.
Peronospora cyparissiae on E. cyparissias and Uromyces scutellatus on E. cyparissias and E. esula. - L.K. [O.BO.]

1616. NAHVE, Z. (Agric.Res.Sta., Nve Yaar, Israel). Native types of Oryzopsis miliacea (L.) Asch. et Schw. in Israel. Bull.Res. Counc.Sect.D Bot., 1959, 7D,(1),51-2.
Differential morphological, phenological and ecological features of 3 types are described: One xerophytic, short-seasoned type with very stout culms, occurring only in the arid Negev area ("Negev type"), and 2 mediterranean types - 1 semiprostrate and calciphilous and very leafy type, occurring only on chalky marl and soft limestone soils ("Northern brown-seeded type") and the other being more shade tolerant, erect, and less leafy, occurring also on terra rossa soils ("Northern grey-seeded type"). - Biol.Abstr. (Plant Sciences), 35,27678.

1617. KULJT, J. (Univ.Vancouver, British Columbia,Canada). The distribution of dwarf mistletoes, Arceuthobium, in California. Madrono, 1960, 15,(5),129-39, figs.
From Biol.Abstr., 35,32686.

1618. POHL, R.W. Introduced weedy grasses in Iowa. Proc.Iowa Acad.Sci., 1959, 66, 160-2, figs.,bibl.1.
Chloris verticillata, Eriochloa villosa and Miscanthus sacchariflorus are newly recorded for Iowa. - Herb.Abstr., 30,669.

1619. COLEMAN, R.G., WINDRUM, G.M. and HUTTON, E.M. (Brisbane Hospital,Australia). Studies on the toxicity of Indigofera endecaphylla. III. Separation of toxic fractions from seed and herbage. J.Nutrition, 1960, 70,(2),267-71.
Methods are described for the extraction of the toxic principle(s) from the seed and herbage of Indigofera endecaphylla. Potent toxic fractions can be prepared from the seed and herbage extracts by the use of cation-exchange resin columns. The amount of toxic principle in the herbage appears to be less than in the seed. - Biol.Abstr.(Plant Sciences), 35,33093.

1620. * LEONARD, N.J. (Univ.,Urbana,Ill., U.S.A.) Senecio alkaloids. Alkaloids, 1960, 6,35-121.

1621. ROEHE, R. Intoxicacao por plantas cianogenicas. [Poisoning by cyanogenic plants.] Bol.Dir.Prod.anim.,1958-9, 12, (125-7),4-8, bibl.7.
In Rio Grande do Sul, Brazil, the best-known plants which are toxic to livestock are: Manihot utilissima, Sorghum vulgare, S. sudanense, Linum usitatissimum, Vicia sativa and Trifolium repens. - Herb.Abstr., 30,607.

1622. UNITED STATES. Higher nitrate-poison may be possible. Crops & Soils, 1960, 12, (8),22.
Recent work by R.F. Crawford and W.K. Kennedy of Cornell University has shown that the dose of nitrate in herbage lethal to dairy cattle may be 3 times as high as previously thought. - L.K. [O.W.]

1623. * GHELASE, G.I. Les plantes aquatiques toxiques et le problème du paturage dans la zone des eaux piscicoles. [Toxic aquatic plants and pasture problems in the zone of fishery waters.] Prob.Zootehn.si.Vet., 1959, 4,35-9, (Rumanian).

1624. * BEIJERS, J.A. [Poisoning in plants.] CMC Melk, 1958, 13,(22),344-7, (23),360-3,365, (Du.)

AQUATIC AND WOODY WEEDS AND THEIR CONTROL

See also 1548,1563,1593, 1623,1664.

1625. * SHALLOCK, D.A. Weed control in drainage and irrigation ditches around bogs. Proc.annu.Meet.Amer.Cranberry Grs' Ass., 1959, 89, 7-11.

1626. * LIEUK, D.B. Recent developments in water lettuce control. Rep.annu.Meet. Fla Anti-Mosquito Ass., 1958, 29,26-7.

1627. * SHAW, J.M. and TIMMONS, F.L. Controlling submerged water weeds on irrigation systems with aromatic solvents. Indian J.Engng Tech., 1954, 6,(10),226-30.

1628. * EGLITE, A. [Method of eradicating the undesirable tree and shrub vegetation with the aid of 2,4-D sodium salt.] Akad. Nauk.Lat.SSR Otdel.Biol.Nauk., 1957, 123-5, (Russ.)

1629. * PETERSON, D.R. and BUCHHOLTZ, K.P. (Univ.,Madison 6, Wisconsin,U.S.A.) Controlling brush, stump and small trees with chemicals. Circ.Univ.Wis.Ext.Serv., 1958, 564,pp.7.

1630. * ZAGORSKII, I.M. [Mechanization of the chemical method for controlling the undesirable tree and shrub vegetation in forests.] Leningrad Tsent.Nauch.Issled. Inst.Lesn.Khoz.Dostizheniia Nauki i Peredovoi Opyt v Lesn.Khoz., 1956, (1), 118-22, (Russ.)

1631. ROGERS, D.J. and ROGERS, P.H. (Dep.Bot.,Univ.,Wisconsin,U.S.A.) Sprouting capacity of oak stumps in Southern Wisconsin. Univ.Wis.For.Res. Note, 1959, 50,pp.3, tabs.2,bibl.2.
The sprouting habits after cutting of Quercus alba and Q. velutina are compared. D.M.L.S. [O.F.]

1632. MOSER, T.H. (Rio Grande Project, El Paso,Texas,U.S.A.) What has been done about salt cedar at Caballo Reservoir. Reclam.Era, 1960, 46,(2), figs.5.
Describes work over a 2-year period to eliminate salt cedar [Tamarix gallica] spread over 5500 ac of the Caballo Reservoir area following an 8-year drought. Adult plants were cleared by 84 in. diameter rotary cutters plus crawler tractors equipped with root rakes - in some areas the cutters were operated in conjunction with the tractors. Aerial spraying with 2,4-D (sodium) in oil and water gave defoliation and some top-kill but failed to eradicate mature plants. Methods usedfor control of regrowth were (a) rotary cutting at yearly intervals, (b) spraying with 2,4-D, 2,4,5-T or 2,4,5-TP formulations. Following these treatments, native grasses - mainly Bermuda and salt grass, spread to provide almost continuous cover of the cleared area. - M.E.L. [O.W.]

1633. SOUTHERN RHODESIA. A study of effects of frequency of burning and slashing in controlling M'sasa-M'nondo coppice. Rep.Grassl.Res.Sta.,Marandellas, 1956-57, 38.
Regrowth of Brachystegia-Julbernardia woodland after cleaning was best controlled by a sequence of autumn slashing, winter frost and spring burning. - Herb. Abstr., 30,665.

1634. FISHER, C.E., MEADORS, C.H., BEHRENS, R., ROBINSON, E.C., MARION, P.T. and MORTON, H.L. Control of mesquite on grazing lands. Bull.Texas agric.Exp.Sta., 1959, 935,pp.24, figs.23,tabs.15,bibl.26.
A description of 3 mesquite varieties (Prosopis juliflora vars. glandulosa, velutina and torreyana] and their distribution in the U.S.A. is given. The following successful methods of control based on experimental results during 1939-1956 are discussed:- 1. Thin to open stands - 50-150 mesquite/ac (a) hand or power grubbing so as to uproot plants well below the lowest sprout buds; (b) basal treatment of single or few-stemmed trees with sufficient kerosene or diesel oil (1-4 pints) to wet the bark and soil thoroughly to the lowest sprout buds on the underground stem; (c) spraying the lower 8-12 in. of the basal stems and root crown areawith 2,4,5-T (ester) 8 lb a.e. in 100 gal oil (1 gal solution to 10-15 trees); (d) basal spraying with monuron 1 lb in 10 gal water (1 gal suspension/10-15 trees) - fenuron was less effective; rapidity of kill varied with soil type; (e) foliage spraying with 2,4,5-T 1 # a.e. in 10-15 gal water controlled seedlings and sprouts. Methods (b) and (c) gave temporary control - 3 to 5 years depending on soil type. 2. Moderate to dense stands. (a) Chaining or cabling gave control for 3-5 years at $1.5-$5.0/ac; in combination with other methods this proved economical for clearing areas of moderate potential productivity; (b) use of heavy-duty brush cutters on mixed brush areas gave control of 5-10 years at $5.0-$10.0/ac; (c) root ploughing plus seeding with grasses cost $8.0-$25.0/ac but was profitable in areas with fertile soil; (d) aerial applications of chemicals at intervals of 5-7 years or following mechanical treatments gave good control at low cost. The most effective herbicide was 2,4,5-T (low volatile esters) at 0.33 # acid in 3 gal 1:6 diesel fuel-water and at swath widths 60-84 ft on original growth or at 0.5 # acid in 4 gal 1:3 diesel fuel-water and at swath width 42 ft on sprout growth. Best kills resulted from sprays of droplet size 100-400 microns applied 50-80 days after the first leaves appeared in spring, when moisture was adequate to support normal foliage development and on light sandy soils. Less effective herbicides for aerial treatments were 2,4-D ± 2,4,5-T, 2,4,5-T (amines), 2,4-DP, MCPA (pellets or solutions). Results of experiments designed to demonstrate the increased grazing capacity of rangeland due to higher yields and nutritive value of buffalo grass following mesquite control are described. Other benefits were a reduction in labour required for handling livestock and a decrease in cattle deaths from mesquite bean poisoning. Experiments on seed survival and reinfestation of land showed that no one treatment completely eliminates mesquite but that maintenance of a good grass cover plus treatments at 5-10 year intervals are required. Precautions for the use of 2,4,5-T are given. - M.E.L. [129(76.4)]

1635. DAY, M.W. (Dunbar For.Exp.Sta.) Effectiveness of some herbicides in killing young red maple. Quart.Bull.Mich.agric.Exp. Sta., 1960, 42,(4),854-8, tabs.1.
2, 3 and 4 in. d.b.h. Acer rubrum trees were injected in late June with (1) amitrole 2 lb/gal, (2) amitrole 1 lb + PBA 4 lb/gal, (3) 2,4-D (alkanolamine salt) 4 lb/gal, (4) 2,4,5-T (triethylamine salt) 4 lb/gal, (5) 2,4,5-T (low volatile propylene glycol butyl ether ester) 4 lb/gal, and (6) PBA (dimethylamine salt) 4 lb/gal. Examination after 2 weeks showed that only trees treated with (4) were markedly affected, these having completely dead leaves. After 8 weeks (4) still gave the best results, but heavier dosages of (2) gave good results; the other treatments gave little definite killing of the trees. 13 months after treatment formulations containing PBA had given the best kill. The minimum effective dosages for the 2 in. stems ranged from 0.5 ml for (4) to 4 ml for (1) and (3). This final examination showed several instances of adjacent A. rubrum stems being killed, and in most cases these formulations contained PBA. - J.W.F. [O.RE.]

1636. * DITTRICH, H.E. Buschhackmaschine - heute noch aktuell? [Scrub cutters - still important today?] Landtechnik, 1959, 14, (17),542-5.

1637. * CASANOVA, A. Le debroussaillement chimique en vue du reboisement et de l'entretien des forets. [Chemical brush control from the viewpoint of reafforestation and forest maintenance.] Rev.Int. Prod.trop.et du Mater.trop., 1959, 34,(353),55.

OTHER WEEDS AND THEIR CONTROL

See also 1556,1562,1563,1565, 1566,1567,1578,1579,1580,1581, 1582,1710.

1638. HARONSKA, G. and LEUCHS, F. (PflSchAmt,Bad Godesberg,Germany). Erfahrungen bei der Sterilisation von Huflattichblüten durch Herbizide. [Experiments on the sterilisation of coltsfoot flowers by herbicides.] NachrBl.dtsch.PflSchDienst. Braunschweig, 1960, 12,(7),97-107, (G.e.), figs.5,tabs.3,bibl.7.
Slag heaps in the brown coal areas near Cologne are infested with Tussilago farfara which serves as a source of infecting agricultural land. As the weed prevents erosion on very steep slopes MCPA + amitrole were tested to prevent flowering. MCPA 0.6 kg/ha was applied in mid-March to prevent drift injury to adjacent crops and trees and gave complete seed sterilisation for 3 weeks only. MCPA 0.6 + amitrole 10 kg/ha was very promising. Higher rates, other compounds and repeat treatments are to be tested.- L.K. [O.W.]

1639. SINGH, B. (B.R.Coll.,Agra,India). Effect of temperature on different concentrations of diesel oil sprays suited to kill the bandha parasite (Dendropthoe falcata (L.f.)Ettings). Hort.Advance, 1958, 2,68-71.
Diesel oil was most effective against D. falcata in May when temperature was highest and least effective in January and December when temperature was lowest. In May, kill was obtained with a 30% concentration; in December and January 55% was required. The month(s)and lowest concentrations to give kill with least injury to the following hosts were: Citrus aurantifolia - December and January, 55% (very slight injury resulting in some leaf shedding); Psidium guajava - May, 30% (no injury); Achras sapota and Zizyphus mauritiana - May, 30% (pronounced effect with drying up of most leaves). Summer spraying killed more rapidly than winter. - D.M.L.S. [MD.H.]

1640. NARAYANAN, T.R., ALVA, K.R. and DHYANCHAND, K. Weed control by chemical herbicides. IV. Madras agric.J., 1959, 46,(11),413-17, bibl.8.
Pennisetum clandestinum was treated in September with (1) TCA 100 # and (2) dalapon 16 # and/or monuron 16 #. Seven months after treatments the plots treated with TCA showed little regrowth; the other plots were less satisfactory. - L.K. [C.A.]

1641. FOX, E.H. (Bur.Sug.Exp.Sta., Brisbane,Australia). Control of grasses on Tully tramline. Cane Grs quart.Bull., 1959, 23,(2),46-8, figs.
Dalapon at ca. 22 lb/mile of track (8-9 ft wide) gave excellent control of Para grass, Blady grass and guinea grasses [Brachiaria mutica, Imperata cylindrica and Panicum maximum] during the wet, hot months of January to April. - L.K. [139(94)]

1642. AUSTRALIA. Serrated tussock coming under control. Agric.Gaz.N.S.W., 1960, 71, (4).
Serrated tussock [Nassella trichotoma] may be controlled by thorough seedbed preparation, sowing a locally adapted pasture mixture with adequate superphosphate and legume innoculation. After establishment the pasture must be carefully managed, particularly in the first year, to ensure tussock seedlings are smothered. Rabbits are not to be tolerated. - L.K. [O.W.]

1643. * NOER, O.J. Yarrow (Achillea multiflora) control. Golf Course Reptr, 1959, 27,(8),26-8.

1644. BONDARENKO, D.D. (Agric.Exp.Sta., Wooster,Ohio,U.S.A.) Simazine and atrazine control weeds in corn. Ohio Fm & Home Res., 1960, 45,(3),43.
Includes the information that velvet leaf [Abutilon theophrasti] is not generally satisfactorily controlled by either compound. - L.K. [O.W.]

1645. DAVIS, R.R. and BONDARENKO, D.D. (Agric.Exp.Sta.,Wooster,Ohio,U.S.A.) New chemicals kill lawn weeds. Ohio Fm & Home Res., 1960, 45,(3),41,47.
Includes the information that 2,4,5-TP has controlled yarrow [Achillea millefolium], ground ivy [Nepeta hederacea] and wood sorrel [Oxalis sp.]. - L.K. [O.W.]

1646. SCOTT, W.O. and SLIFE, F.W. (Univ., Urbana,Illinois,U.S.A.) A new cornfield weed menace. Crops & Soils, 1960, 12,(8), 19-20, figs.3.
Muhlenbergia frondosa is best controlled by fallowing after an early maturing small grain crop. The following spring a crop tolerating pre-em. 3 # simazine or atrazine or 4 # CDAA should be sown. - L.K. [O.W.]

1647. SERFONTEIN, J. Control of jointed cactus: "encirclement plan" gives good results. Farming S.Afr., 1959, 35,(9),42-3.
Gives details of the scheme under which 2,4,5-T is being issued first to outlying districts after which the circle is narrowed. - D.M.L.S. [C.A.]

1648. LOPEZ, V.H. and OLALGUIAGA, F.G. (Min.Agric.,Santiago,Chile). Biological control of St. Johns-wort in Chile. Plant Prot.Bull., 1959, 7,(11),144-6.
Many grasslands of Chile are infested by weeds, some of which are toxic. In the Lluta valley, salt grass (Distichlis spicata var. thalassica) is a noxious weed of lucerne. In the province of Coquimbo, Astragalus spp. are spreading in natural pastures. Other noxious weeds are Galega officinalis, Rubus ulmifolius and Echium vulgare. Information is given on St. John's wort [Hypericum perforatum] which has spread in southern regions. In an attempt to control this weed by biological means, beetles of Chrysolina hyperici and C. quadrigemina were introduced from California and released in infested pastures. Although the beetle colonies did not prosper in some places, an area estimated at 7000 ha has been cleared of St. John's wort by this method. - Herb.Abstr., 30,662.

1649. RUZINOV, P.G. Chemical control of bindweed (Convolvulus arvensis). Sborn. Nauch. Issled.Rabot Azovo-Chernomorsk. Selskokhoz.Inst., 1957, 15,237-43.
Bindweed (Convolvulus arvensis) must be completely eradicated or it will reinfest. The use of 1300 l/ha of a 3% solution (a 4% solution is better) of $(NO_2)_2C_6H_3ONH_4$ destroys all the bindweed and 86.4% of the above-ground stalks of lucerne and dicotyledonous weeds. However, after 3-4 weeks lucerne grows to the same size as unsprayed lucerne. Addition of 0.15% of wetting agent OP7 permits the use of only 1000 l/ha. Preparation No. 125 gives the same effect but is weaker. A 2% solution of $Cl_3C_6H_2ONa$ gives the same effect, but $Cu(OC_6H_2Cl_3)_2$ is of little use because it is only slightly soluble. Antrol (stable 60% emulsion of anthracene oil) gives good results upon using 2000 l/ha of an 8% emulsion containing 4.8% of oil. Carbolineum (I) must be used in at least 15% solution. Naphthenic soap (II) in 15% solution gives 100% eradication, and the normal size of lucerne is restored in 2 weeks. To accelerate the effect it is advisable to add 0.5% of alkali to (II). Soap fabrication wastes containing 8-9% of fatty acids and over 1% of free alkali undiluted or diluted 1.3-1.5 times destroy bindweed upon using 1500-2000 l/ha NH_4NO_3 in 15-20% solution gives almost entire destruction of bindweed, but 2000 l/ha of a 10% solution with 6% of (I), 5-6% of (II), or 0.4-0.5% of 2,4-D must be used for satisfactory results. Use of NH_4NO_3 is recommended on vegetables because it is not poisonous. In all cases spraying must take place after mowing. - Chem.Abstr., 54,7046 g.

1650. AUSTRALIA. Plough to kill cape tulip. J.Dep.Agric.S.Aust., 1960, 63,(11), 470-1, figs.3.
Cape tulip [Homeria collina and H. miniata] should be ploughed when the new bulb is just forming and the old bulb has just begun to wither. Two-leaved cape tulip [H. miniata] needs repeated cultivations to destroy resprouting bulbs. - L.K. [O.W.]

1651. LINDEN, G. and IMMEL, R. (C.H.Boehringer Sohn,Ingelheim/Rh.,Germany). Versuche zur Bekämpfung von Wald-Bingelkraut mit Herbiziden. [Experiments on the control of dog's mercury with herbicides.] Allg. Forstz., 1960, 15,(27),384-5, (G.), tabs.2.
Mercurialis perennis treated when the seeds were ripe was not controlled by Dowpon (dalapon) 10-30 kg/ha, TBA 10-30 kg/ha or TBA + 2,4,5-T. 100% control was given by amitrole 10 kg/ha and Celatox P (mecoprop) 3 kg/ha. In a second year's trials, when spraying was carried out at the full flower stage amitrole was equally effective but mecoprop somewhat less so. Application of either compound in 200 l/ha was as good as in 1000 l. Amitrole also eradicated Dentaria bulbifera, Asperula odorata, Lamium luteum and Aronstab [Arum maculatum]; beech mast falling in the year of treatment germinated normally the following year. - L.K. [O.F.]

1652. * ALEKSIEV, A. Ein neues Mittel zur Bekämpfung der Tabakwürger (Orobanche ramosa). [A new means of controlling Orobanche ramosa.] Bulgar.Tiutiun,1959, 4,(4),152-4, (Bulgarian).

1653. UNITED STATES. Witchweed campaign starts. Agric.Chemic., 1960, 15,(7),77.
Ca. 117 000 ac on 6094 farms infested with witchweed [Striga spp.] are to be treated. More than 5000 ac have been treated with fenac which, last year, when disked in 10-14 days before planting maize, gave season-long weed control without crop injury. 98 000 ac are to be treated with 2,4-D and 12 500 ac to be given cultural methods. - L.K. [O.W.]

1654. AUSTRALIA. Kill mistletoe. Rur. Res.C.S.I.R.O., 1959, 29,24-9, figs.6, tabs.1,bibl.6.
Damage from mistletoe [Amyema pendula] is serious in all states except Tasmania, and especially in New South Wales and Queensland. Control by possum, which have a great liking for it, is obviously impracticable. Injecting 10% 2,4-D (triethanolamine) has given 70-100% control of mistletoe on Eucalyptus spp. near Canberra and instructions are given for treatment on the following spp. E. robertsoni, E. polyanthemos, E. macrorrhyncа, E. camuldulensis, E. pilularis, E. hemiphloia, and E. sideroxylon, with details of kill and host damage to be expected. E. maculata has been found to be rather susceptible. - D.M.L.S. [M.D.H.]

1655. DONALDSON, T.W. (Dep.Crown Lands & Survey,Victoria,Australia). Chemicals used in weed control. Part IV. J.Dep. Agric.Vict., 1960, 58,(6),361,363-5, 367-71, figs.6.
The characteristics of non-selective herbicides and of soil fumigants are reviewed. - L.K. [O.W.]

1656. WILSON, F. (Div.Entomology, C.S.I.R.O.,Canberra,Australia). A review of the biological control of insects and weeds in Australia and Australian New Guinea. Tech.Comm.Commonw.Inst.Biol. Control., 1960, pp.102, bibl.
The section on weeds (p.51-68) reviews work with insects in Australia and Tasmania on Opuntia spp., Hypericum perforatum, Lantana camara, Cyperus rotundus, Eupatorium adenophorum and E. riparium, on all of which at least partially satisfactory results have been obtained, and on Ulex europaeus, Xanthium pungens, X. spinosum, Senecio jacobaea, Heliotropium europaeum and Chondrilla juncea on which little or no success has been achieved. A fungus, Colletotrichum xanthii, has given promising results on X. spinosum and Cercospora eupatorii on Eupatorium adenophorum. All species tested are listed and there is an extensive bibliography. The last part (p.69-79) includes sections on sources of beneficial insects established, the use of natural enemies, the use of diseases, the use of natural enemies other than insects and diseases, the seasonal liberation of natural enemies and factors prejudicing the success of investigations. - L.K. [L.AM.]

1657. ARMAREGO, W.L.F. (c/o Dep.Med.Chem., John Curtin School for Med.Res.,Nat.Univ., Canberra,Australia). The synthesis of 5,7-dichlorocoumaran-3-one and related problems. Aust.J.Chem., 1960, 13,(1),95-102, bibl,13.
The theory that 2,4-D reacts to form the coumaranone in the plant is referred to and attempts to synthesize the coumaranone described. - D.M.L.S. [136(94)]

1658. LANGENBECK, W., FÜRST, H. and REINISCH, G. (Martin Luther Univ.,Halle, Germany). Catalytic hydrolysis of 1,2,4-trichlorobenzene in the vapour phase. J.prakt.Chem., 1955, 2,(4),308-15.
A synthesis of 2,4,5-T. - From Chem. Abstr., 54,5526d. - M.E.L.

1659. MARTYNOV, Yu.M., MATVEEV, M.A., YAKIMENKO, L.M. and FURMAN, A.A. Production and application of magnesium chlorate defoliants. Khim.Prom., 1958, 420-3.
From Chem.Abstr., 54,11363b. - M.E.L.

1660. MILICEVIC, B.T., and JANKOVIC, S.D. Analysis of substituted acetic acids used as herbicides IV. Separation of trichloroacetic acid and 2,4-dichlorophenoxyacetic acid. Bull.Soc.Chim.Belgrade, 1958/59, 23-24, 67-73, bibl.18.
Three procedures are given for the separation of the acids by (i) ascending paper-strip chromatography, (ii) countercurrent distribution in a 25-tube apparatus and (iii) decomposition of TCA with NaOH. - From J.Sci.Fd Agric., 1960, 11,(7),ii-17. M.E.L.

1661. MILICEVIC, B.T. and KOSTIC, I.L. Analysis of substituted acetic acids used as herbicides. V. Joint determination of 2,4-dichlorophenoxyacetic acid and 2,4,5-trichlorophenoxyacetic acid by differential-solubility method. Bull.Soc.Chim.Belgrade, 1958/59, 23-24, 75-77.
A mixture of the two acids dissolved in acetone is titrated with water to the first appearance of turbidity. The log. curve for ml of water vs. acid concentration is linear; maximum error is 2%. - J.Sci.Fd Agric., 11,(7),ii-17.

1662. YEO, R.R. (Univ.,Minnesota,U.S.A.) The adsorption of the sodium salt of 2,4-D on kaolinite, bentonite and cellulose. Ph.D.Thesis,Univ.Minnesota, 1959, pp.55, Microfilm $2.50; Xerox $3.00.
Maximum amounts of 2,4-D adsorbed on bentonite, kaolinite and cellulose after 1 minute's contact were 9.3, 27.2 and 1680 µg respectively. Adsorption equilibriums were attained when the 2,4-D was allowed to stand in contact with the clays for 2.3 and 2.8 hours, when the amounts adsorbed increased by 33.3% on bentonite and 12.8% on kaolinite. Other studies indicated that drying clays after they had been hydrogenated influenced the amounts of 2,4-D that could be adsorbed on them. Flax seeds which germinated on the adsorbents after they had adsorbed 2,4-D showed a stimulation of growth of the hypocotyls. When 0.1 to 0.4 mg were adsorbed on 0.25 g samples of cellulose, maximum hypocotyl growth stimulations occurred; when amounts > 0.9 mg were adsorbed inhibition of hypocotyl growth resulted. - From Diss.Abstr., 20,3911. - J.W.F.

1663. MEDGYESI, G., KATONA, K. and GERENCSER, N. (Hosp.Sopron,Hungary). Effect of derivatives of phenoxyacetic acid on some pathogenic fungi. Vitamine u.Hormone, 1959, 8,350-61.
2,4-D, 2,4,5-T and MCPA were generally inhibitory in vitro at concentrations between 0.025 and 0.1% to Trichophyton gypseum granulosum, Candida albicans, Trichothecium roseum, and Achorion gallinae, MCPA and/or a combination of 2,4-D and 2,4,5-T were also inhibitory in most instances to Epidermophyton floccosum. Trichophyton ochropyraceum, T. violaceum var. niger, T. rubrum, T. purpureum, and several unidentified strains. - Chem.Abstr., 54, 5813d.

1664. NEURURER, H. and SLANINA, K. (Bundesanst.f.PflSchutz,Wien,Austria). Chemische Bekämpfung unerwünschter Teichpflanzen mit besonderer Berücksichtigung der Fischtoxizität von Herbiziden. [Chemical control of unwanted aquatic plants with particular reference to the toxicity of herbicides to fish.] PflSchutz Ber., 1960, 24,(8/10),139-62, (G.e.), figs.7,tabs.4,bibl.28.
Reports laboratory and field tests to determine effects of herbicides on plants and fish and organisms eaten by fish. The herbicides tested were: 2,4-D, MCPA, 2,4,5-T, 2,4-D + 2,4,5-T, dalapon, monuron, chlorpropham, simazine, SMDC, amitrole + monuron and amitrole + TCA + 2,4-D (= 'Cutralin'). Effective doses in mg/l are given for Phoximus laevis, Gammarus pulex and Daphnia pulex and for Myriophyllum verticillatum, M. demersum, Stratiotes aloides, Potamogeton sp. and Chara sp. A comparison of the dose required for weed control (pD) and that which is

tolerated by the fish and their animals (fD) is expressed as the security quotient (S), where S = fD/pD. The opinion is expressed that at present it is feasible to use only chemicals with a quotient higher than 20; in the tests only simazine and 'Cutralin' had values greater than this. In the field tests, M. verticillatum could be controlled without endangering the fish or their food by using 18 mg 'Cutralin'/l. - H.A.Roberts. [NVRS]

1665. PROWSE, G.A. (Fish Culture Res. Inst.,Malacca,Malaya). Notes on the toxicity to fish of some common agricultural insecticides and weedicides. Pest.Abstr. News Summary A, 1959, 5,(4),508-9.
In tests on Tilapia fingerlings in a tank 100 p.p.m. 2,4,5-T (butyl) was lethal due to an oil film on the water surface restricting the oxygen supply. TCA 100 p.p.m. caused no distress after several days contact. Simazine 120 p.p.m. caused 70% mortality in 4 hours but after 12 hours the tanks were no longer toxic. - L.K. [O.W.]

1666. UNITED STATES. Tolerances for residues of diuron. Fed.Reg., 1960, 25, 1438.
The previous tolerances under the Federal Food, Drug, and Cosmetic Act for diuron are revised to include 2 p.p.m. in or on corn fodder or forage (including sweet corn, field corn, and popcorn) and 1 p.p.m. in or on corn in grain or ear form (including sweet corn, field corn, and popcorn). - Chem.Abstr., 54,11314c.

APPLICATION AND MACHINERY

See also 1636.

1667. COURSHEE, R.J. (N.I.A.E.,Silsoe, Beds.,England). Spray nozzles. Pest Technol., 1960, 2,(10),209-14, figs.6.
A review of the properties of hydraulic, airblast and rotating nozzles. - L.K. [O.W.]

1668. * LONERGAN, R.P. and HALL, L.B. The regulation of flow through residual spray nozzles 1-2. Bull.World Health Organ., 1959, 20,(5),955-71.

1669. BYASS, J.B. (N.I.A.E.,Silsoe,Beds, England). Droplet formation and assessment. Monograph Soc.Chem.Industr., 1958, 2, 89-100, figs.4,tabs.1,bibl.10.
A review with particular reference to droplet formation. Compressed-air nozzles, rotary atomisers, blown-air nozzles and swirl nozzles are considered. - L.K. [O.W.]

1670. EISENKLAM, P., DOMBROWSKI, N. and HASSON, D. Drop formation from rapidly moving liquid sheets. Min.Supply D.G.G.W. Rep., 1959, EMR/59/3; Imp.Coll.Rep., 44, pp.42, figs.,tabs.4,bibl.35.
The 3 types of instability manifested in flat sheets produced by fan spray nozzles and their effects on drop size are discussed. - From Authors' Abstract. - L.K. [N.I.A.E.]

1671. * MOSLAGIN, P. A sprayer from ammonia-spreading equipment. Selsk.Khoz.Sibiri, 1959, 11,69.
For herbicide application.

PHYSIOLOGY, MORPHOLOGY AND ANATOMY

See also 1563,1572,1657.

1672. KARAPETYAN, N.O. [Results of experiments with two new herbicides.] Sborn.Nauch.Trud.Armen.Selsk.Inst., 1958, (10),273-88, (Armenian.russ.)
One of the compounds was the 2,4-dichlorophenoxyacetyl hydrazone of chloral which when incorporated in the soil under laboratory conditions showed a good herbicidal effect. - From Ref.Zh.Biol., 1960,44918.

1673. MASHTAKOV, S.M., LEDOVSKII, S.Ya. and VOLKOVA, L.I. [Experiments on the physiological activity of amitrole derivatives.] Dok.AN BSSR, 1959, 3,(10), 422-5, (Russ.)
The physiological activity of 5-aminotetrazol (1), 1-phenyl-3-methylpyrazolone-5 (sodium) (2), benzimidazole hydrochloride and salts of benzimidazole with TCA was studied under laboratory conditions. The experiments showed that (1) and (2) stimulated plant growth, although the physiological activity of these compounds was less than 2,4-D and much less than heteroauxin. - Ref.Zh.Biol., 1960, 60553.

1674. NIKOLAEVSKIJ, V.G. [The herbicide 2,4-D and nastic movement.] Priroda, 1959, 48,(10),110, (Russ.)
When seedlings of thornless gleditschia were sprayed with 2,4-D at 1000 p.p.m. the leaflets remained expanded during the following night. During the next few days petiole and stem curvature was observed, and the leaflets drooped and remained closed. - Hort.Abstr., 30,(2),1556.

1657. AYMARD, M. Coalescence florales chez Anagallis arvensis L. traite a l'acide 2,4-dichlorophenoxyacetique. [Floral coalescence in Anagallis arvensis L. treated with 2,4-D.] Bull.Soc.bot.Fr., 1960, 107, (1/2),1-3, (F.), figs.4,bibl.5.
Four types of abnormalities are described and illustrated. - L.K. [O.BO.]

1676. MACOVSCHI, E. (Inst.biochim.Acad. R.P.R.,Bucharest). Capillary method for the introduction of chemical compounds and biological products into the body of plants. Comun.acad.rep.populare Romine, 1958, 8, 183-7.
A capillary method is described which makes it possible to observe continuously and accurately the quantity of the substance taken up by the plant, the rate of penetration, and the functional rhythm of absorption. The method consists in placing 1 end of a degreased thread into a container with the solution to be introduced, and the other end into the stem of the plant. - Chem.Abstr., 54,11156i.

1677. HOMER, R.F., MEES, G.C. and TOMLINSON, T.E. (I.C.I.Ltd,Jealott's Hill Res.Sta.,Bracknell,Berks,England). Mode of action of dipyridyl quaternary salts as herbicides. J.Sci.Fd Agric., 1960, 11,(6), 309-315, tabs.3,bibl.13.
Treatment of one leaf of mustard and tomato plants with a series of quaternary salts derived from 2,2'-, 2,4'- and 4,4'-dipyridyl showed that (a) toxicity decreased with decrease in redox potential, (b) light was essential for a rapid kill of green tissue but the compounds were also slowly lethal in the dark, (c) oxygen was essential for the functioning of the material in the light. The compounds studied were 1,1'-ethylene-2,2'-, 1,1'-di-β-hydroxyethyl-4,4'-, 1,1'-ethylene-5,5'-dimethyl-2,2'-, 1,1'-ethylene-4,4'-dimethyl-2,2'- and 1,1'-trimethylene-2,2'-dipyridylium dibromides, 1,1'-di-β-carboxyethyl-4,4'-dipyridylium dichloride and 1,1'-dimethyl-4,4'-dipyridylium di-iodide. On the basis of these results it was concluded that these compounds were active herbicides because they were capable of being reversibly reduced within the plant, by processes connected with photosynthesis and respiration, to toxic free radicals stable in aqueous solution. - M.E.L. [O.W.]

1678. JOHANNES, H., FUCHS, W.H. and VOGEL, J. (Lab.Bot.Mittelprüfung,Braunschweig,Germany). Zur Ermittlung der Phytotoxizität von Pflanzenschutzmitteln. [The determination of the phytotoxicity of pesticides.] NachrBl. dtsch.PflSchDienst.Braunschweig, 1960, 12, (6),82-5, (G.e.), figs.5,tabs.3.
Two methods were developed for testing copper fungicides. The first, which was designed to estimate the phytotoxicity of compounds not producing any gross effect, consists of measuring the area of dwarf bean leaves before and after treatment and expressing the result as the % inhibition of growth compared with the controls. The second consists of cutting off below the cotyledons the shoot of Phaseolus vulgaris seedlings with the primary leaves not quite fully expanded, treating and then placing the cut end in containers of tap water for 24-48 hours and finally scoring the cuttings on a scale where 0 = no effect, 1 = mild wilting, 2 = strong wilting and some drying out of the tissue, 3 = 50% of the leaf surface wilted or dried up, 4 = 80% of the leaf surface wilted or dried up and 5 = 100% of the leaf surface dried up. - L.K. [O.W.]

1679. TAYLORSON, R.B. (Univ.Wisconsin, U.S.A.) The nature of the maleic hydrazide inhibition and its relation to auxin processes. Ph.D.Thesis, Univ.Wisconsin, 1960, pp.115, Microfilm $2.50, Xerox $5.60.
The first phase of this study was concerned with the effect of autumn treatments of MH on the levels of endogenous stimulators and inhibitors found in the acid fraction of ether extracts of lyophilized bud samples of Rosa rugosa taken over the course of the the dormant period and during the initial phases of active growth from plants held in the field and in storage. Such MH treatments were found to inhibit subsequent sprouting at the end of the dormant period. No effect could be found on the levels of the 2 stimulating substances and one inhibitor in the buds, which could account for the inhibitory activity of MH. One of the stimulators was presumed to be indole acetic acid.

The second phase was directed toward an explanation of interaction phenomena found in systems undergoing cell enlargement in the presence of MH and auxins. MH was found to reduce the stimulatory influence of low concentrations of auxins on the elongation of Avena coleoptiles and water uptake in potato discs. Higher concentrations of auxins could overcome this inhibitory action of MH in Avena coleoptiles, while this treatment was only partially effective with potato discs. It was found that by pre-treating the potato discs with auxins and then transferring them to inhibitory levels of MH for a final incubation, MH was no longer able to over come the stimulatory action of NAA that had occurred during the pre-treatment period. Pre-treating the discs with MH, however, prevented any subsequent stimulatory action of NAA in the final incubation period. These studies show that the initial action of auxin on the enlargement of cell walls is profoundly affected by MH. Utilizing radioactive MH, it was found that some of the chemical becomes affixed to a fraction of cellular solids obtained on grinding and centrifuging the discs.

A study was made of the effect of MH on the stimulation of protein synthesis induced by auxins during the early stages of cell enlargement. No positive conclusions could be reached.

Interaction phenomena could also be demonstrated in vivo in etiolated whole and decapitated pea seedlings. - Diss.Abstr., 20,3918.

1680. TRUHAUT, R. and DEYSSON, G. Antimitotic activity in the urethan series. V. Various derivatives substituted in the nitrogen atom. Ann.pharm.franc., 1959, 17, 117-88.

The compounds investigated were N-aldehydrourethane, N-hydroxymethylurethane, methylene diurethane and N-bis(β-chloroethyl)urethane.- M.E.L. - From Chem.Abstr., 54,4782i.

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1681. GREAT BRITAIN. Haloganoaryloxyalkyl esters of α,α,β-trichloropropionic acid. British Patent, 1957, 807 599.

The compounds useful as plant-growth control agents and parasiticides (especially active against Rhizoctonia solani), are obtained by interaction of α,α,β-trichloropropionic acid with a (halogenoaryl)oxyalkanol (alkylene chain of 2-4 C) in presence of an acid catalyst in a water-insoluble solvent. Details are given of the preparation of 2-(2,4,5-trichlorophenoxy)ethyl α,α,β-trichloropropionate, m.p. 101-102°, b.p. 178-183°/0.5 mm. - J.Sci.Fd Agric., 1960, 11,(6),i-289.

1682. GREAT BRITAIN. Polyhydric alcohol esters of 2,2,3-trichloropropionic acid. British Patent, 1957, 807 697.

Compounds useful in the control of growth of weeds and seeds, comprise fully esterified derivatives of polyhydric alcohols (diethylene glycol, ethylene glycol, propylene glycol glycerol or erythritol) and 2,2,3-trichloropropionic acid. A description is given of the preparation of diethylene glycol di-(2,2,3-trichloropropionate), b.p. 190-192°/1 mm. - From J.Sci.Fd Agric., 11,(6),i-289. - M.E.L.

1683. RIGTERINK, R.H. 3,4-Dihydro-1,3-benzoxazines. British Patent, 1957, 807 698.

Compounds useful as herbicides, bactericides (Salmonella typhosa and Staphylococcus) and fungicides (Aspergillus terreus and Rhizopus nigricans) comprise 3-cyclohexyl-3,4-dihydro-1,3-benzoxazines substituted in the 6-position by alkyl of 4-7 C containing $\nless$ 3 C in a straight chain. The preparation of 6-s-butyl-3-cyclohexyl-3,4-dihydro-1,3-benzoxazine is detailed. To Dow Chemical Co. - J.Sci.Fd Agric., 1960, 11,(6),i-289.

1684. GREAT BRITAIN. Phthalides. British Patent, 1957, 807 908.

To Dow Chemical Co. - From J.Sci.Fd Agric., 1960, 11,(6),i-288. - M.E.L.

1685. GREAT BRITAIN. Polyhydric alcohol esters of 2,2-dichlorobutyric acid and herbicide and parasiticide compositions containing them. British Patent, 1957, 808 116.

The compounds active as plant-growth control agents and parasiticides (especially Rhizoctonia solani), are obtained by interaction of 2,2-dichlorobutyric acid with an aliphatic polyhydric alcohol. One example given is diethylene glycol bis(2,2-dichlorobutyrate), b.p. 128-142°/0.05 mm. J.Sci.Fd Agric., 1960, 11,(6),i-289.

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1688. STEVENSON, H.A., BROOKES, R.F. and LUSH, G.B. α-(4-chloro-3,5-dimethylphenoxy)propanoic acid and its derivatives as herbicides. British Patent, 1959, 820 156.
Synthesis of the 2-butoxyethyl-, 2-(2-butoxyethoxy)ethyl- and 3,5,5-trimethylhexyl esters of the title acid. The esters and salts of the propionic acid with sodium, potassium, ammonia and organic amines, Et_2NH, $(HOCH_2CH_2)_2NH$, $HO(CH_2)_2NH_2$, $(HOCH_2CH_2)_3N$ and $EtNH_2$, applied as aqueous solutions, emulsions or dusts controlled wild oats [Avena fatua], Chenopodium album, Stellaria media and Brassica kaber in cereal grains and peas. To Boots Pure Drug Co.Ltd. - From Chem.Abstr., 54,7057c. M.E.L.

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Synthesis and melting or boiling points of α-phenoxypropionic acids substituted in the phenoxy group with Cl and Me, and their salts, esters and amides. To Boots Pure Drug Co.Ltd. - From Chem.Abstr., 54, 7652e. - M.E.L.

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Synthesis of α-(3,4-dichloro-5-methylphenoxy)-, α-(3,4,5-trichlorophenoxy)- and α-(4-bromo-3,5-dimethylphenoxy)propionic acids. To Boots Pure Drug Co.Ltd. - From Chem.Abstr., 54,10225i. - M.E.L.

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To Esso Research and Engineering Co. Addition to German Patent 1 016 058. - From Chem.Abstr., 54,11367g. - M.E.L.

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Synthesis. To Stauffer Chemical Co.
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MISCELLANEOUS

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The paper discusses, inter alia, the costs of spraying; the use of a contractor versus the farmer having his own sprayer; the advantages of herbicide spraying; grassland spraying; the cost of couch control by dalapon, bastard and bare fallows and rotovating; the chemical renovation of pasture; and herbicide spraying of sugar beet. - D.M.L.S.
[O.RE.]

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[W6(71)]

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1710. TIDEMAN, A.F. The Weeds Act. What it means to you and your district council. J.Dep.Agric.S.Aust., 1960, 63, (9),376-80, tabs.2.
Twelve "dangerous weeds" i.e. weeds which must be eradicated and 49 "noxious weeds" i.e. weeds which should not be allowed to spread and if possible should be controlled, are listed. The responsibilities of landowners, local councils and government and how the provisions of this Act for South Australia are implemented, are outlined. - L.K.
[O.W.]

List of Common Names and Chemical Abbreviations

Revised August, 1960.

The following list, based on that adopted by the Weed Society of America has been approved by the British Weed Control Council, except those marked □.
An asterisk (*) signifies common names approved by the B.S.I.
A plus sign (+) signifies approval by the Weed Society of America.

amiben □+	3-amino-2,5-dichlorobenzoic acid
amitrole □+	3-amino-1,2,4-triazole
AMS □+	ammonium sulphamate
atrazine □+	2-chloro-4-isopropylamino-6-ethylamino-1,3,5-triazine
barbane □	4-chloro-2-butynyl-N-(3-chlorophenyl)carbamate
CDAA +	2-chloro-NN-diallylacetamide
CDEA +	2-chloro-NN-diethylacetamide
CDEC +	2-chloroallyl-NN-diethyldithiocarbamate
chlorpropham *	isopropyl-N-(3-chlorophenyl)carbamate
4-CPA +	4-chlorophenoxyacetic acid
4-CPB	4-(4-chlorophenoxy)butyric acid
2,4-D +*	2,4-dichlorophenoxyacetic acid
3,4-DA +	3,4-dichlorophenoxyacetic acid
dalapon +*	2,2-dichloropropionic acid
2,4-DB *	4-(2,4-dichlorophenoxy)butyric acid
DCU +□	dichloralurea
2,4-DEB +	2,4-dichlorophenoxyethyl benzoate
2,4-DES *	2,4-dichlorophenoxyethyl hydrogen sulphate
dichlone +*	2,3-dichloro-1,4-naphthaquinone
dinosam *	2-s-amyl-4,6-dinitrophenol
dinoseb *	2-s-butyl-4,6-dinitrophenol
diquat +*	1,1'-ethylene-2,2'-dipyridylium dibromide
diuron +	N-(3,4-dichlorophenyl)-N'N'-dimethylurea
DMTT + □	3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione
DNOC *	2-methyl-4,6-dinitrophenol or 3,5-dinitro-o-cresol
2,4-DP	2-(2,4-dichlorophenoxy)propionic acid
endothal +	3,6-endoxohexahydrophthalic acid
EPTC +□	ethyl-NN-dipropylthiolcarbamate
erbon +	2-(2,4,5-trichlorophenoxy)ethyl-2',2'-dichloropropionate
fenac □+	2,3,6-trichlorophenylacetic acid
fenuron +	N-(phenyl)-N'N'-dimethylurea
ipazine □+	2-chloro-4-diethylamino-6-isopropylamino-1,3,5-triazine
MCPA +*	4-chloro-2-methylphenoxyacetic acid
MCPB *	4-(4-chloro-2-methylphenoxy)butyric acid
MCPES +	sodium 4-chloro-2-methylphenoxyethyl sulphate
mecoprop *	dl-2-(4-chloro-2-methylphenoxy)propionic acid
MH +□	maleic hydrazide
monuron +*	N-(4-chlorophenyl)-N'N'-dimethylurea
neburon +	N-(3,4-dichlorophenyl)-N'-butyl-N'-methylurea
NPA +	N-1-naphthylphthalamic acid
PCP +	pentachlorophenol
PMA +	phenyl mercuric acetate
propazine +□	2-chloro-4,6-bis(isopropylamino)-1,3,5-triazine
propham *	isopropyl-N-phenylcarbamate
simazine +	2-chloro-4,6-bis(ethylamino)-1,3,5-triazine
SMDC +□	sodium methyl dithiocarbamate
2,4,5-T +*	2,4,5-trichlorophenoxyacetic acid
2,4,5-TB	4-(2,4,5-trichlorophenoxy)butyric acid
2,3,6-TBA +	2,3,6-trichlorobenzoic acid
TCA +	trichloroacetic acid
2,4,5-TES +	sodium 2,4,5-trichlorophenoxyethyl sulphate
2,4,5-TP	2-(2,4,5-trichlorophenoxy)propionic acid
trietazine +□	2-chloro-4-diethylamino-6-ethylamino-1,3,5-triazine
TY9 □	tris-(2,4-dichlorophenoxyethyl)phosphite

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